

CLAIMS

1. A method to prepare at least part of at least one surface of a substrate comprising; depositing on said surface at least one plasma monomer wherein during
5 deposition of said monomer, means are provided which move the monomer source across a surface to be treated to manufacture a non-uniform plasma polymer surface.
2. A method as claimed in claim 1 wherein said means moves said substrate relative to said monomer source.
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3. A method as claimed in claim 1 wherein said means moves said monomer source relative to said substrate.
4. A method as claimed in any of claims 1 to 3 wherein the surface comprises at
15 least one plasma polymer of at least one monomer wherein the concentration of said plasma polymer is non-uniform across said surface, or part thereof.
5. A method as claimed in any preceding claim wherein there is provided a surface comprising two or more plasma polymers formed from at least two
20 monomers.
6. A method as claimed in any of claims 5 wherein the concentration of at least one plasma polymer is non-uniform across said surface, or part thereof.
- 25 7. A method as claimed in any preceding claim wherein the monomer is a volatile alcohol.
8. A method as claimed in any of claims 1 to 6 wherein said monomer is a
30 volatile acid.

9. A method as claimed in any of claims 1 to 6 wherein the monomer is a volatile amine.
10. A method as claimed in any of claims 1 to 6 wherein the monomer is a volatile hydrocarbon.
11. A method as claimed in any of claims 1 to 6 wherein the monomer is a volatile fluorocarbon.
12. A method as claimed in any of claims 1 to 6 wherein the monomer is an ethyleneoxide-type molecule.
13. A method as claimed in any of claims 1 to 6 wherein the monomer is a volatile siloxane.
14. A method as claimed in any of claims 1 to 6 wherein said monomer is at least one selected from the group consisting of: allyl alcohol, acrylic acid, octa-1,7,-diene, allyl amine, perfluorohexane, tetraethyleneglycol monoallyl ether or hexamethyldisiloxane (HMDSO).
15. A method as claimed in any of claims 4 to 14 wherein said polymer consists of a single monomer.
16. A method as claimed in claim 15 wherein said monomer consists essentially of an ethylenically unsaturated organic compound.
17. A method as claimed in claim 16 wherein the monomer consists essentially of a single ethylenically unsaturated organic compound.
18. A method as claimed in claim 17 wherein the monomer consists of an ethylene oxide type molecule.

19. A method as claimed in claim 16 or 17 wherein the compound is an alkene, a carboxylic acid, an alcohol or an amine.
- 5 20. A method as claimed in claim 15 wherein the monomer consists of a mixture of two or more ethylenically unsaturated organic compounds.
21. A method as claimed in claim 20 wherein the compounds are selected from the group consisting of: an alkene, a carboxylic acid, an alcohol, or an amine.
- 10 22. A method as claimed in claim 15 wherein the monomer consists essentially of a saturated organic compound.
23. A method as claimed in claim 15 wherein the monomer consists essentially of
- 15 an aromatic compound or a heterocyclic compound.
24. A method as claimed in any preceding claim wherein the monomer has a vapour pressure of at least 6.6×10^{-2} mbar.
- 20 25. A method as claimed in any of claims 4 to 14 wherein the polymer is a co-polymer.
26. A method as claimed in claim 25 wherein the co-polymer comprises at least one organic monomer with at least one hydrocarbon.
- 25 27. A method as claimed in claim 26 wherein the hydrocarbon is an alkene.
28. A method as claimed in any preceding claim wherein the monomer (s) is/are deposited on said surface in spatially separated dots.
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29. A method as claimed in any of claims 1 to 27 wherein the monomer (s) is/are deposited on said surface in tracks or lines.
30. A method as claimed in claim 28 or 29 wherein the dots and/or lines are of
5 different polymer chemistry.
31. A method as claimed in claim 30 wherein the chemical composition of the line, track or dot is non-uniform along its length and in height.
- 10 32. A substrate comprising a surface obtainable by the method claimed in any of claims 1 to 31.
33. A substrate as claimed in claim 32 selected from the group consisting of: glass; plastics (e.g. polyethylene terephthalate, high density polyethylene, low density
15 polyethylene, polyvinyl chloride, polypropylene or polystyrene); nitrocellulose, or nylon, metal, ceramics, quartz, metal films or silicon wafer.
34. An assay product comprising the substrate of claim 32 or 33.
- 20 35. An assay product as claimed in claim 34 that is a microarray.
36. An assay product as claimed in claim 35 that is a microtitre plate.
37. A product for separating cells and/or proteins and/or macromolecules
25 comprising the substrate of claim 32 or 33.
38. A substrate as claimed in claim 32 or 33 further comprising a microfluidic device, or a part thereof (e.g. valve, switch, guide channel, binding site, pump).
- 30 39. An assay product as claimed in claim 34, 35 or 36 for use with an array printer.

40. An assay product as claimed in claim 34, 35 or 36 for use with an array reader.